In-Space Hybrid Energy Storage System Demonstration on CSUNSat1

Completed Technology Project (2015 - 2016)

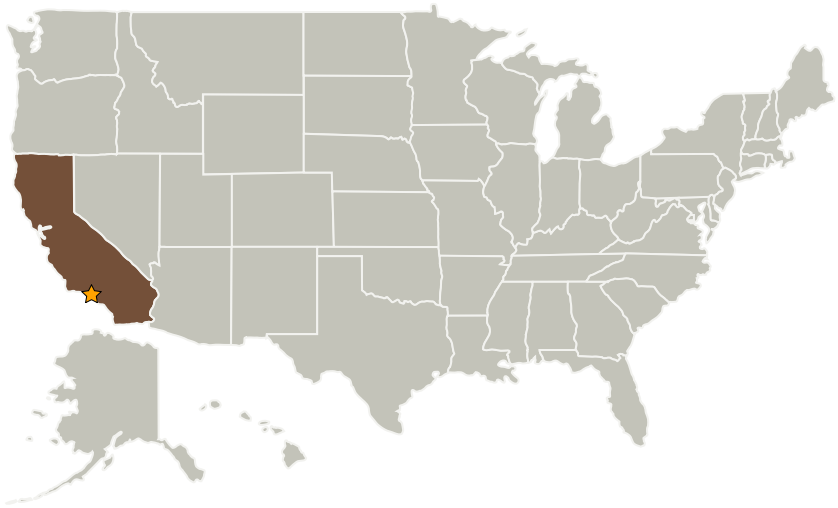
Project Introduction

Objective: Flight demonstrate the JPL Hybrid Energy Storage System (low temperature, high power) using the SSTP-funded CSUNSat1 CubeSat: Environmental testing complete 9/25/15; Won CubeSat Launch Initiative Proposal so we have an expense paid launch (JPL-CSUN partnership); Selected for possible March 2016 ISS Launch. Funding proposed for these remaining activities: Support Launch Activities: Checkout of final spacecraft sequences through ground testing of the fully integrated CubeSat. Flight Operations: Experimental sequences while in flight. When characterization is complete, swap in the JPL Hybrid Energy Storage System as primary energy storage. Data Processing & Analysis: Post processing of data and validation of Hybrid Energy Storage System performance based on in flight data. Ready for infusion

Anticipated Benefits

Relevance & Impact: This is an enabling technology for 3 classes of Missions: 1. Landers & in situ instruments; Europa Lander; MSR (OS); 2. Sensor networks; 3. Deep Space small spacecraft. Benefits include: Cold temperature operation eliminating need of energy for battery heating; and, high discharge rate enabling high power operations such as communication and instrument operation normally not possible.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
California State University-Northridge	Supporting Organization	Academia	Northridge, California

Primary U.S. Work Locations
California

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Project Management

Program Director:

Michael R Lapointe

Program Manager:

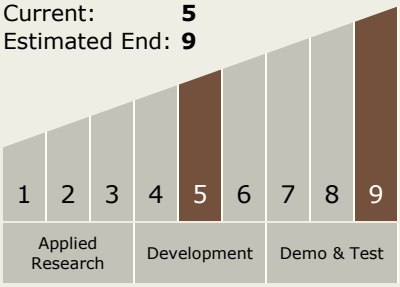
Fred Y Hadaegh

Principal Investigator:

Gary S Bolotin

Technology Maturity (TRL)

Start: **5**
Current: **5**
Estimated End: **9**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.3 Advanced Concepts for Energy Storage